

TS-R-IN32M3-CL

User Manual

(R-IN32M3-CL Evaluation Board)

Issued: October 1, 2013 (Version 1.1)

Tessera Technology Corporation

TS-TUM01739W

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We, Product Compliance Division

TESSERA TECHNOLOGY INC.

4F, 2710-1 Noborito, Tama-ku, Kawasaki city, Kanagawa 214-0014 JAPAN

Phone: +81-44-271-7533 Fax: +81-44-271-7534

declare under our sole responsibility that the product

Product: Board test systems

Model: TS-R-IN32M3-CL Evaluation Board

to which this declaration relates is in conformity with the following standards of other normative documents

EN 61326-1:2013 (Basic immunity test requirements)

IEC 61000-4-2:2008 (± 4 kV contact discharge / ± 8 kV air discharge)

IEC 61000-4-3:2006+A1:2007+A2:2010 (80 – 1000Mhz, level 2 (3V/m) /
1.4 – 2.0GHz, level 2 (3V/m) / 2.0 – 2.7GHz, level 1 (1V/m))

IEC 61000-4-5:2005 (± 0.5 kV DC power port: line to line /
 ± 1.0 kV DC power port: line to earth/
 ± 1.0 kV Signal port: line to earth)

IEC 61000-4-4:2004+A1:2010 (Signal ports: ± 1.0 kV)

IEC 61000-4-6:2008 (AC power ports: level 2 (3V))

IEC 61000-4-8:2009 (3 A/m 50 Hz, 60Hz)

CISPR 11:2009+A1:2010 Group 1 Class A Radiated emission (30 MHz – 1.0 GHz)

following the provisions of EC Council Directive

EMC Directive 2004/108/EC

Authorized Representative

Signature: 

Hitoshi Akimoto

TESSERA TECHNOLOGY INC.

The president

Date of Issue: October . 1 . 2013

TS-TER01832

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Version	Date	Description
Ver. 1.0	Aug 1, 2013	Initial version
Vwe.1.1	Oct 1,2013	research and development Only Insert DECLARATION OF CONFORMITY Insert

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1. Application

This user's manual provides explanations for use of the TS-R-IN32M3-CL Evaluation Board.

Applicable board version: TS-R-IN32M3-CL_002

2. Overview

The R-IN32M3-CL board was developed for evaluating the R-IN32M3-CL device and offers the following interfaces:

- Giga-Ethernet (CC-Link IE)
- CC-Link (Master/Slave)
- UART (USB mini-B)
- I2C
- CAN
- External memory (Serial_Flash /Parallel_Flash)
- External memory/MCU interface
- JTAG (ICE_I/F)
- Others, such as switches and LEDs

This board specification does not support the following combinations:

- CC-Link IE and CC-Link (Slave)
- CC-Link (Master) and CC-Link (Slave)
- CC-Link (Master/Slave) and CAN (ch0)
- CC-Link IE and CAN (ch0, ch1)
- CC-Link (Master/Slave) and I2C (ch1)

* CC-Link (Master): indicates master station, local station, and intelligent device station

* CC-Link (Slave): indicates remote device station

* CC-Link (Master) will be supported in the future.

Note: The CC-Link/CC-Link IE circuits on this board do not meet conformance requirements.

3. Specification

Item	Specification		
Main ASSP *1	Renesas Electronics System LSI "R-IN32M3-CL" ARM Cortex™-M3 32-bit RISC CPU with HW-RTOS (Hardware Real-Time OS) 1.3M-byte RAM large-capacity Operating frequency 100MHz		
Ext. Memory	Flash memory (Serial)	64Mbit, S25FL064P0XNFI001 equivalent	
	Flash memory (Parallel)	128Mbit (8Mx16bit), S29GL128S10TFI010 equivalent	
Interface	I2C	2Ch	4 × 1 pin 2.54mm header
	External Host MCU	1Ch	50 × 2 pin 0.6mm connector
	UART	1Ch (UART to USB)	USB mini-B connector *2 USB-Ver2
	CAN (±80V Fault protection Up to 1Mbps)	1Ch	CAN transceiver 4 × 1 pin 2.54mm header
	CC-Link IE	2Ch	RJ-45 Giga-Ethernet Ext' PHY
	CC-Link	1Ch (Master or Slave)	35605-5153-B00 PE equivalent
	JTAG(ICE)	1Ch	20-pin half-pitch connector (Trace supported)
LED	Power Supply	1 red LED	
	Giga-Ethernet Monitor	4 red and yellow LEDs per Ch	
	CC-Link Monitor	8 red and green LEDs	
	CC-Link IE Code Monitor	9 green LEDs	
	CC-Link IE Monitor	9 red and green LEDs	
	Ext. MCU interface selection	1 green LED	
	UART(Tx/Rx)	2 green LEDs	
DIP-SW/ Rotary-SW	Operation mode selection	8 bits (SW1)	
	CC-Link channel selection	2 rotary switches (SW17 and SW20)	
	CC-Link IE channel selection	2 rotary switches (SW18 and SW19)	
	CC-Link (Master) Baud rate selection	1 rotary switch (SW22)	
	CC-Link (Slave) Baud rate selection	1 rotary switch (SW21)	
	CC-Link (Slave) Initial value set	3 bits (SW24)	
	CC-Link IE Initial value set	4 bits (SW23)	
Power Supply	AC Adapter	+5.0V +/- 5%, 2A or more (center plus)	
Operation Temp.	0 to +70°		

*1 -- ASSP means "Application Specific Standard Product," a standard System LSI. Please refer to the Renesas datasheet and user's manual for details concerning R-IN32M3-CL.

*2 -- The USB cable must be inserted and detached while the board is powered.

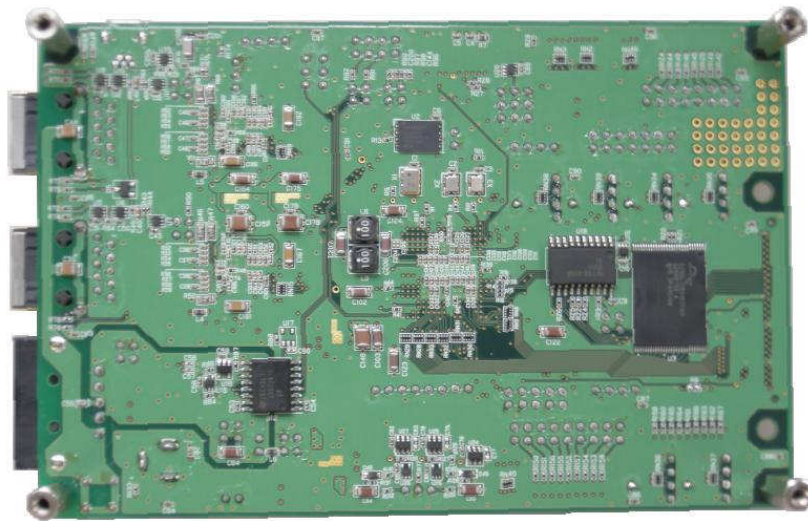
4. External View

The following are photos outlining the board's exterior.

4.1. Board Component Side



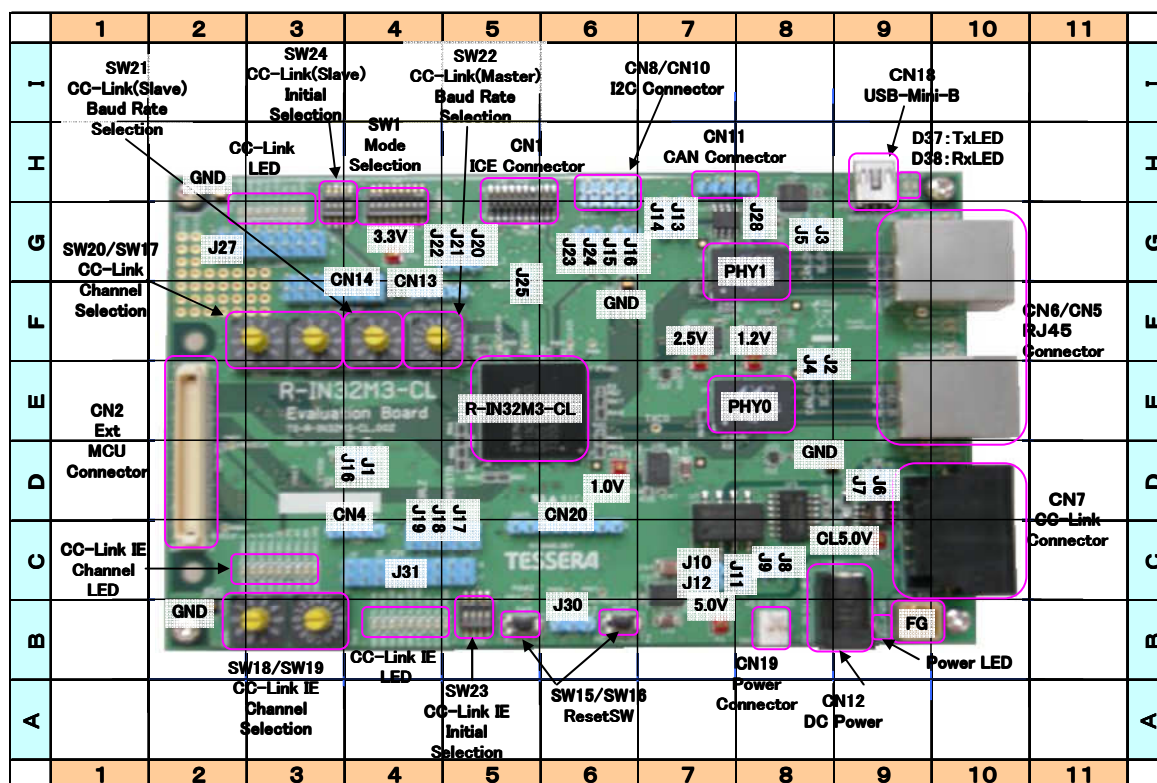
4.2. Board Soldering Side



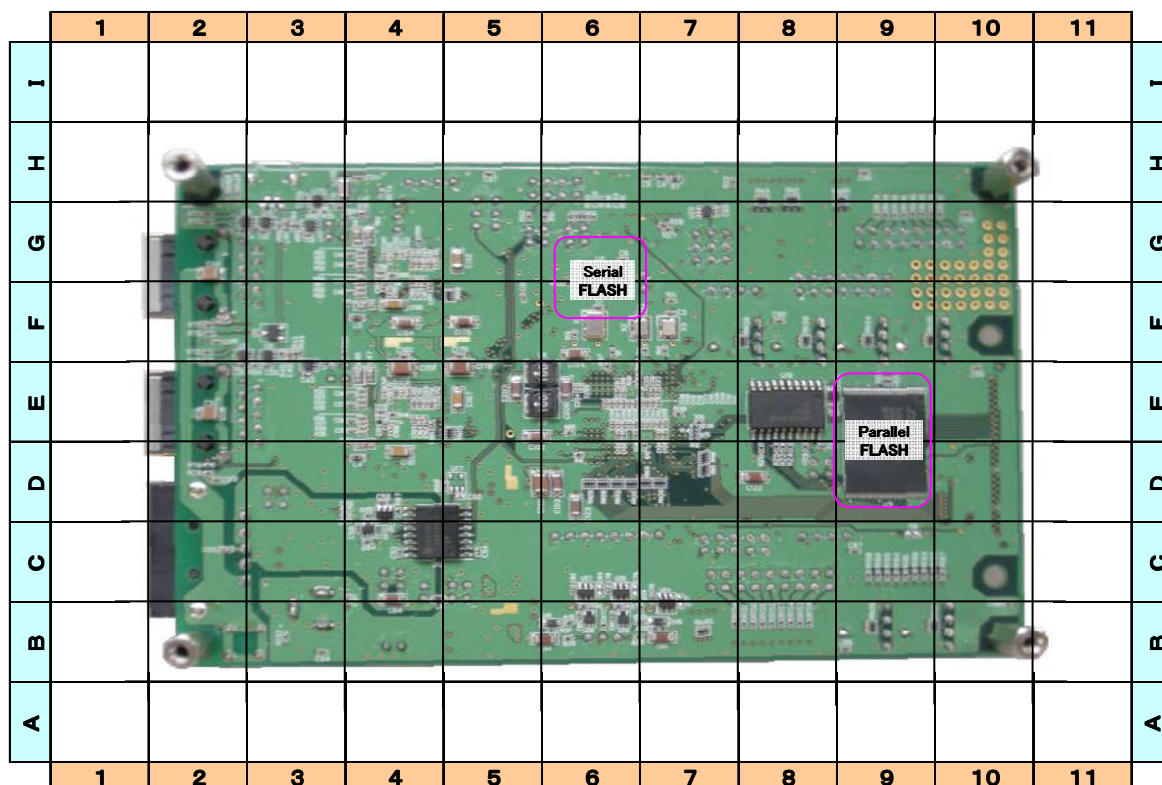
5. Section Names

The following photos provide coordinates and labels to help locate specific positions on the board when referred to later in this document.

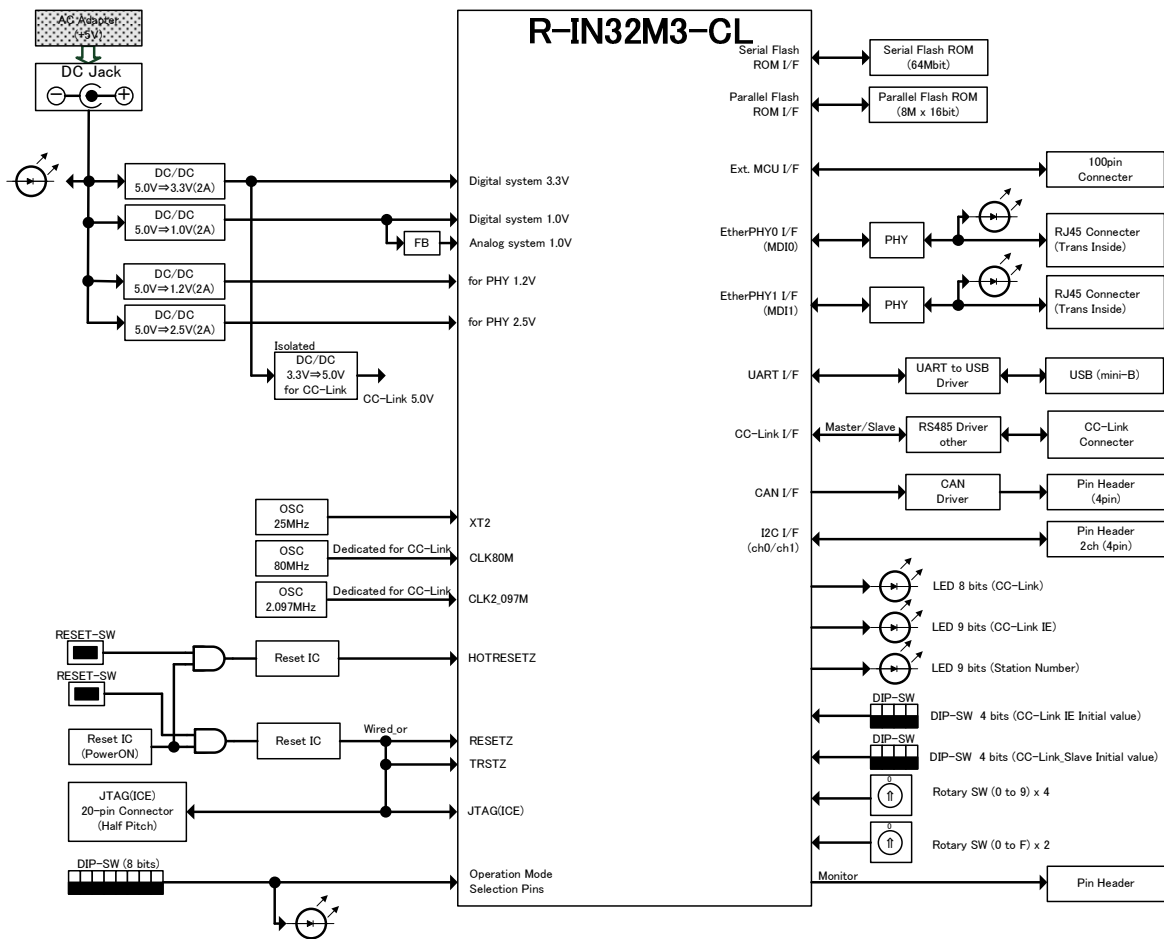
5.1. Board Component Side



5.2. Board Soldering Side



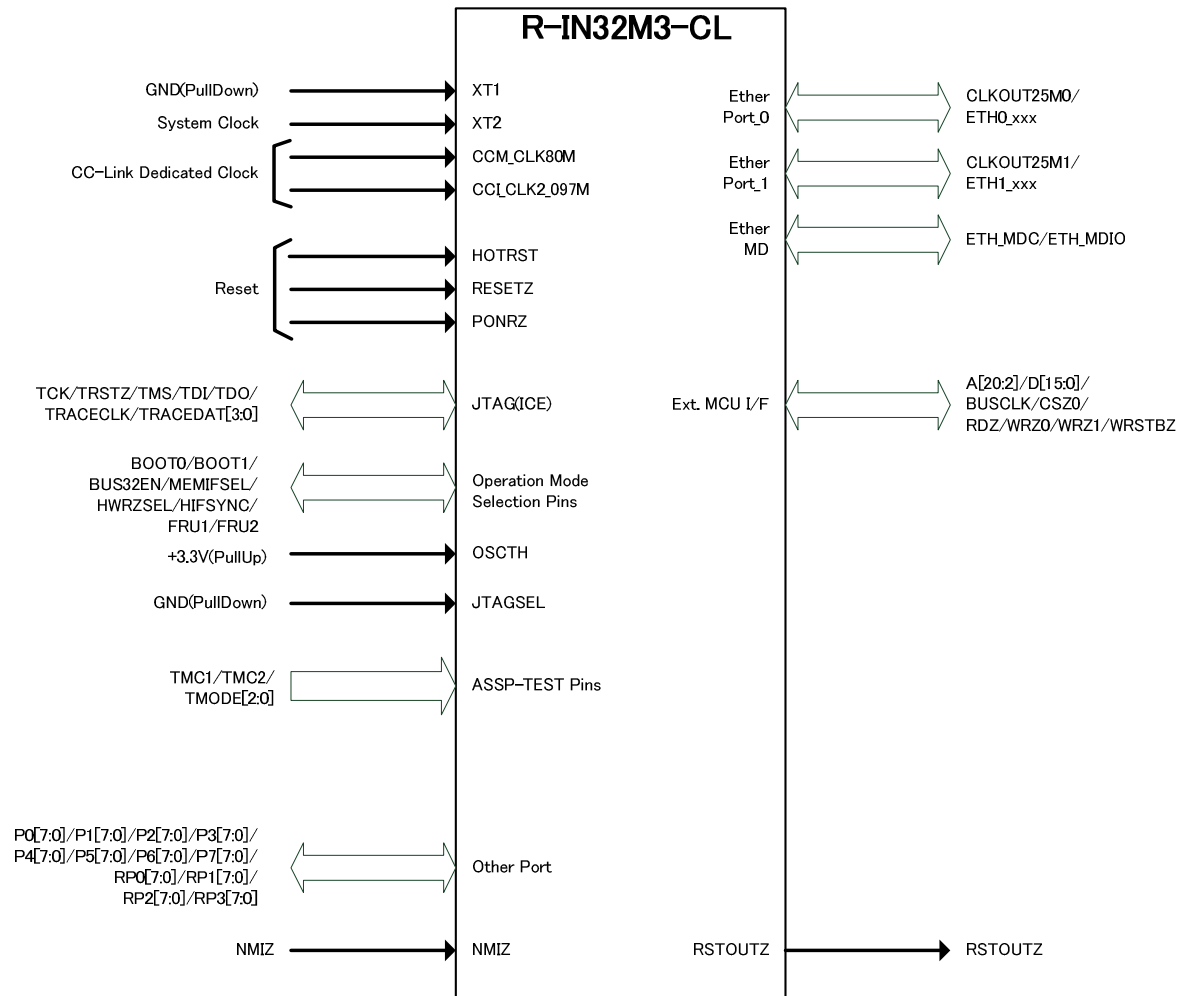
6. Board Block Diagram



7. Block Descriptions

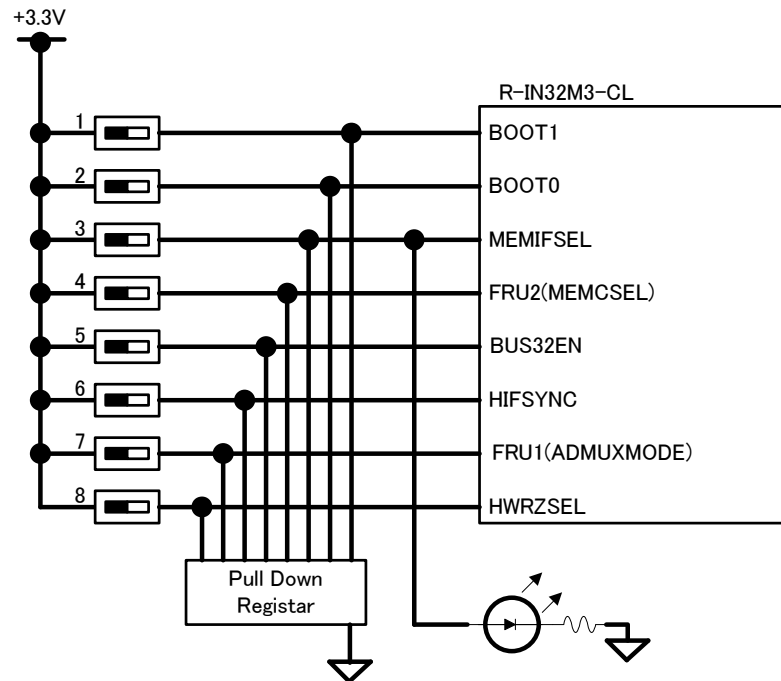
7.1. R-IN32M3-CL

Refer to the corresponding Renesas Electronics Corp. datasheet and user's manual for more details.



7.2. Operation Mode Selection

An 8-bit DIP switch (DIP-SW1) is provided for operation mode selections.

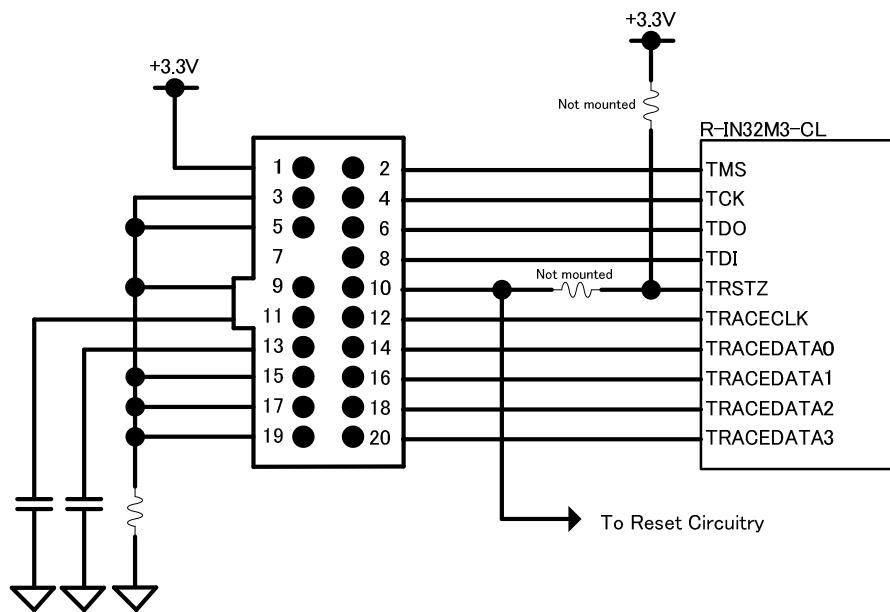


7.3. JTAG (ICE) Interface

The JTAG (ICE) connector is available for the on-board CPU, R-IN32M3-CL. The connector is a 10 x 2 pin header with 1.27 mm pitch.

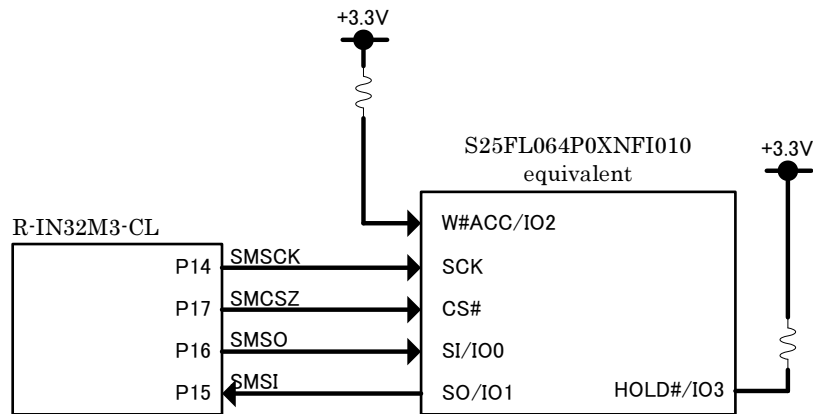
*To avoid incorrect insertion, the 7th pin is pulled out.

*Signal TRSTZ is wired-OR connected to signal RESETZ pin.



7.4. External Memory (Serial_Flash)

A serial flash memory (S25FL064P0XNFI010 equivalent) is used to boot the internal CPU.

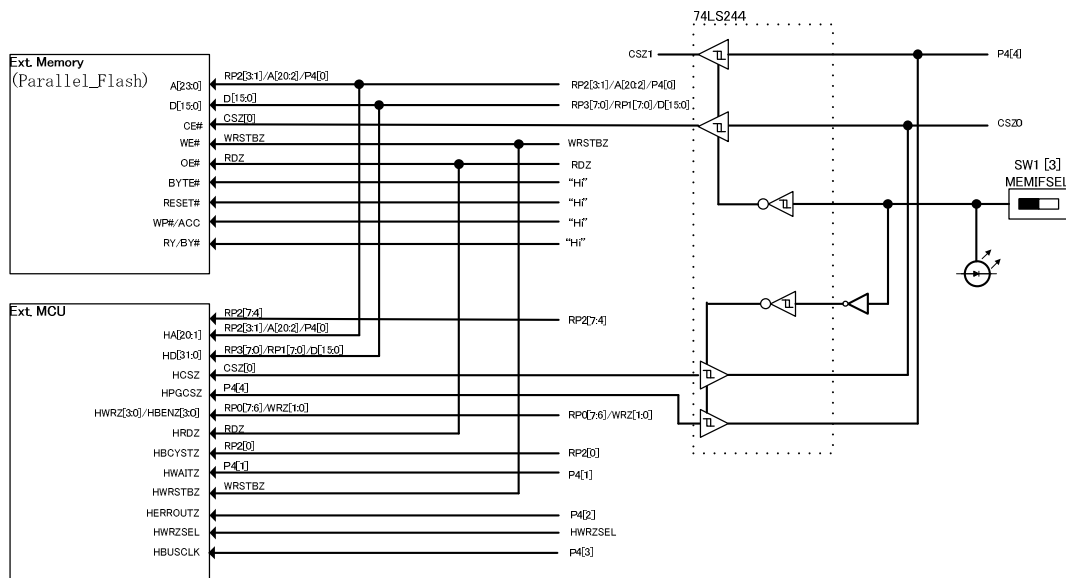


7.5. External Memory (Parallel_Flash)/External Host Interface

A parallel flash memory (S29GL128S10TFI010 equivalent) is mounted for the external memory.

A 100-pin header (CN3) is provided for interface with the external host MCU.

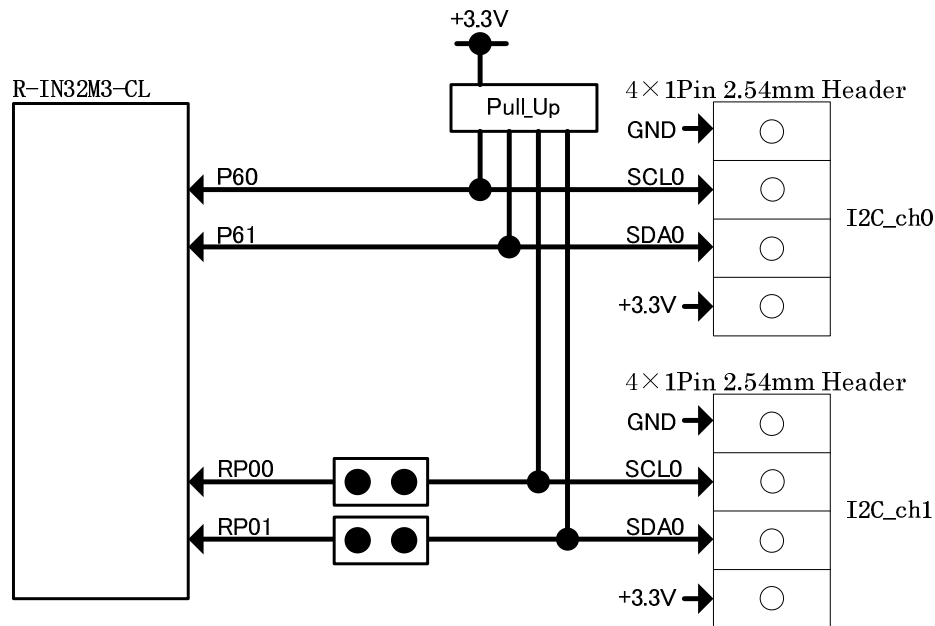
DIP-SW (SW1) selects either external memory interface CSZ0 or external host interface HCSZ/HPGSCSZ, exclusively.



7.6. I2C Interface

R-IN32M3-CL is connected to the header, enabling I2C sync communications (2 channels).

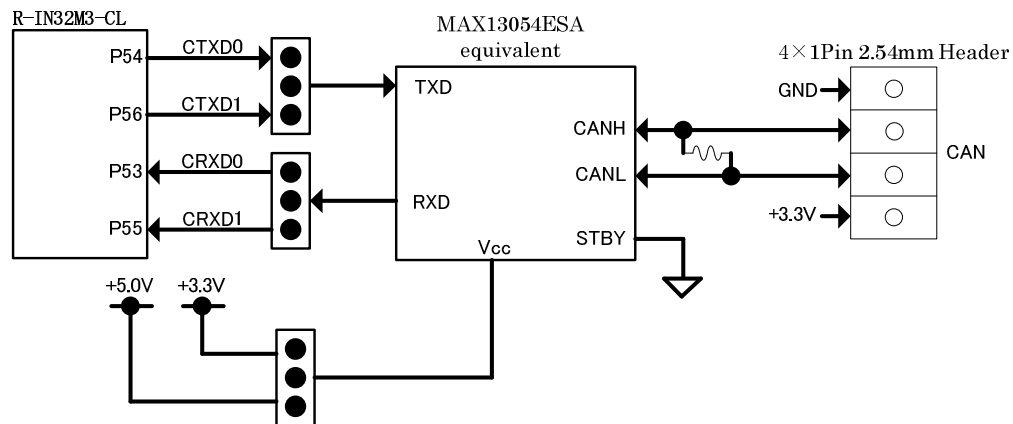
A 4 x 1 pin header (2.54mm pitch) is available for I2C interface.



7.7. CAN Interface

The board offers a CAN driver and pin header, supporting CAN communication. A 4 x 1 pin header (2.54mm pitch) is available for CAN interface.

*CAN interface cannot be used during CC-Link IE communications.

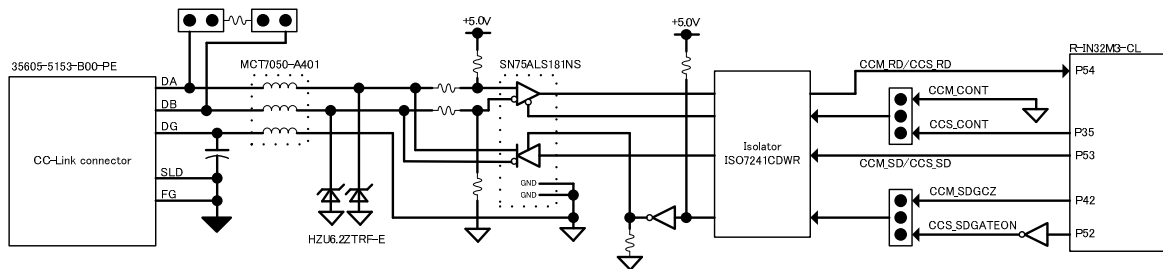


7.8. CC-Link (Master/Slave) Interface

The board offers isolators, RS485 transceivers, and filters, supporting CC-Link (Master/Slave) communication.

Connector 35610-5153-B00-PE is also mounted on the board.

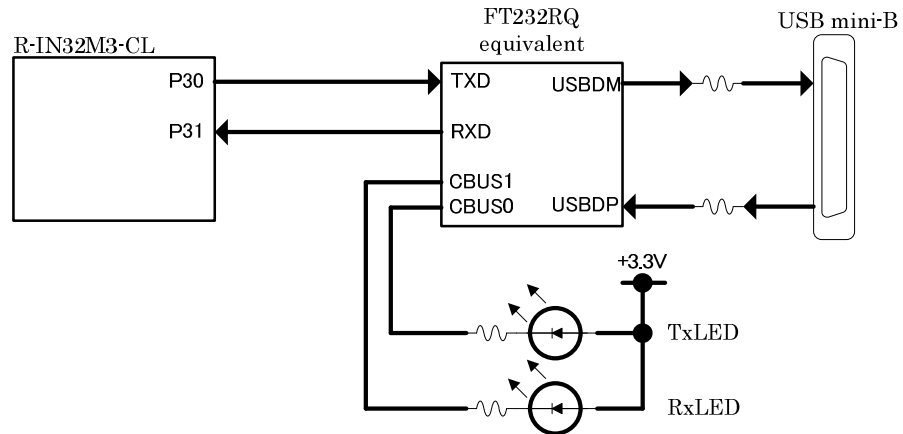
*Use a jumper to set communication to Master or Slave.



7.9. UART Interface

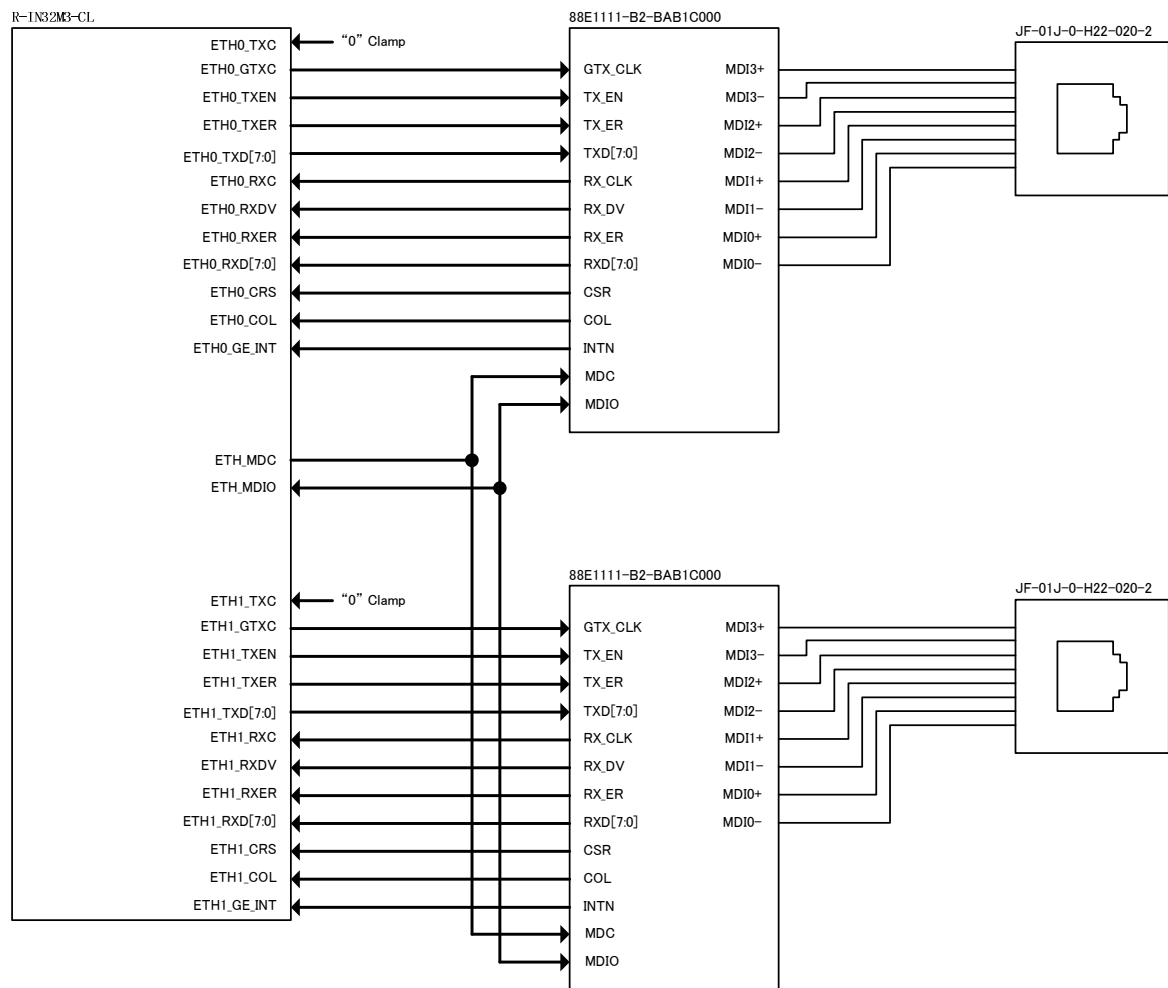
The board offers a UART-to-USB chip for the UART0 function (FT232RQ) and a USB connector, supporting PC communication in asynchronous mode.

A USB mini-B connector is mounted for UART interface.



7.10. CC-Link IE (Giga-Ethernet) Interface

The board is equipped with an on-chip Ethernet PHY (88E1111-B2-BAB1C000) for CC-Link IE communication. The external connector consists of 2 channels of RJ45 which embed transformers.



*Ethernet monitoring LEDs

Px_ERR	Red LED
Px_LNK1000	Yellow LED
Px_LNK100	Yellow LED
Px_LNK10	Yellow LED

7.11. Power Supply

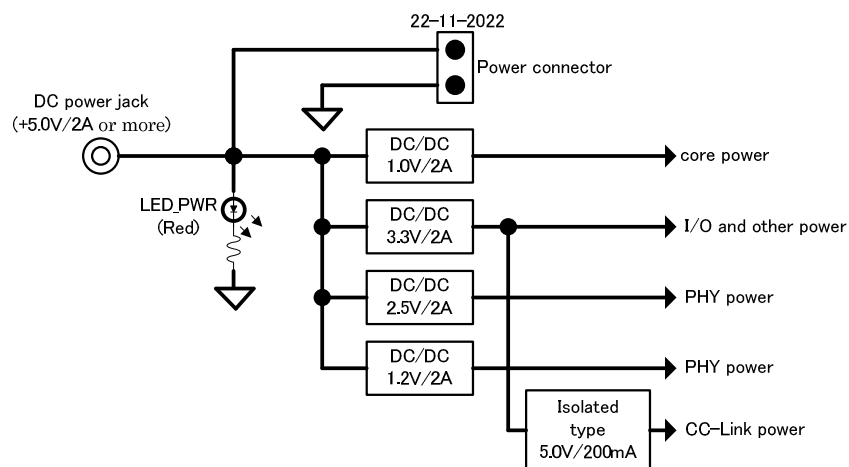
DC 5V power is provided via the DC power jack and generates power for various on-board devices.

The DC/DC converter array provides the following current capacities: 3.3V 2A (max), 1.0V 2A (max), 2.5V 2A (max), 1.2V 2A (max).

When 5.0V is supplied, LED_PWR (red) turns on.

The 5V power supply for CC-Link is generated through the isolated DC/DC via the 3.3V output.

The R-IN32M3-CL evaluation board also comes with a 5V power connector for connections to other boards (the corresponding TS-R-IN32M3-CL).

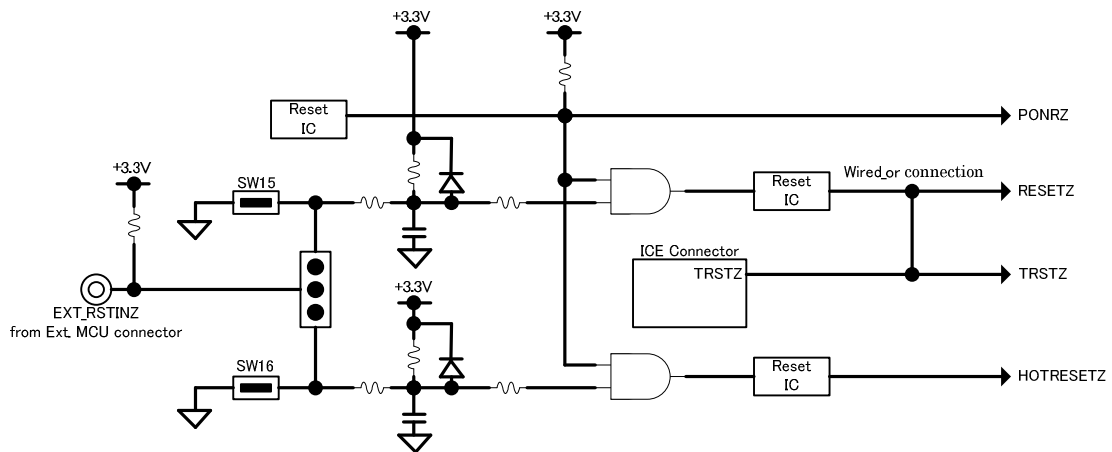


7.12. Reset

When the board is powered, push the reset button (SW15/SW16) or apply a reset signal via the ICE connector, to reset all board resources.

During the power-on reset, the on-chip redundancy RAM is also reset.

The board also provides jumpers to apply external resets via the external host interface connector.



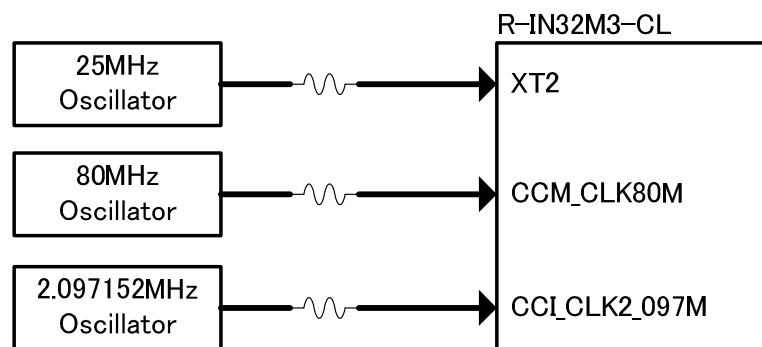
* During Power ON, PONRZ must be 20ms LOW, and RESETZ and HOTRESETZ must be 40ms LOW.

* Push Switch must apply at least 20ms LOW.

7.13. Clocks

This evaluation board provides the following clocks: R-IN32M3-CL system clock (25 MHz), CC-Link clock (80 MHz), and CC-Link IE clock (2.097152 MHz).

*Oscillation stabilization period for each oscillator: 10ms.



7.14. Port Controls

- ① DIP-SW (CHS-04TB equivalent) is provided for the CC-LINK IE initial mode setting.
- ② LED (9-bit) is provided for displaying the CC-Link IE station number.
- ② One rotary switch (SC-1110/SC-2110 equivalent) is provided for each CC-Link IE station number setting.
- ④ Rotary switch (SC-1110) is provided for the CC-Link (Master) baud rate setting.
- ⑤ Rotary switch (SC-2110) is provided for the CC-Link (Slave) baud rate setting.
- ⑥ DIP-SW (CH-04TB) is provided for the CC-Link (Slave) initialization setting.
- ⑦ Two rotary switches (SC-2110 equivalent) are provided for the CC-Link station number settings.

8. DIP, Rotary, and Push Switch Configurations

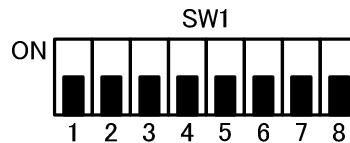
8.1. SW1: Mode Setting

Location: H-4

Board Silk: SW1

Part #: COPAL CHS-08TB (or equivalent part)

SW1 is an 8-bit DIP switch connected to the I/O ports of the R-IN32M3-CL chip. This switch defines the operation mode of the chip.



SW1		Level		Pin Name	Boot Mode Selection
2	1	2	1		
ON	ON	H	H	BOOT0 BOOT1	Instruction Ram Boot (Debug only)
ON	OFF	L	H		Ext. MCU Boot
OFF	ON	H	L		Ext. Serial Flash ROM Boot
OFF	OFF	L	L		Ext. Memory Boot

SW1	Level	Pin Name	Ext. Memory I/F Type Selection
3			
OFF	L	MEMIFSEL	Slave Memory I/F
ON	H		Ext. MCU I/F
SW1	Level	Pin Name	Ext. Memory Controller Setting
4			
OFF	L	FRU2 (MEMCSEL)	Asynchronous SRAM MEMC
ON	H		Synchronous burst access MEMC
SW1	Level	Pin Name	Ext. Memory I/F Bus Width Selection
5			
OFF	L	BUS32EN	16-bit Bus
ON	H		32-bit Bus
SW1	Level	Pin Name	Ext. MCU I/F Operation Mode Selection
6			
OFF	L	HIFSYNC	Asynchronous SRAM Interface
ON	H		Synchronous SRAM Interface
SW1	Level	Pin Name	Ext. Memory I/F Address MUX Selection
7			
OFF	L	FRU1 (ADMUXMODE)	Connect in parallel
ON	H		Address bus is MUXed on data bus
SW1	Level	Pin Name	Ext. MCU I/F HWRZ/HBENZ Selection
8			
OFF	L	HWRZSEL	HBENZ is selected
ON	H		HWRZ is selected

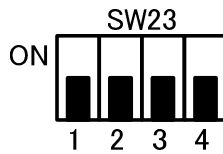
8.2. DIP-SW SW23: DIP Switch for CC-Link Initialization Setting

Location: B-5

Board Silk: SW23

Part #: COPAL CHS-04TB (or equivalent part)

SW23 is a 4-bit DIP switch connected to the I/O ports of the R-IN32M3-CL chip. This switch sets the initial values for the CC-Link IE.



Pin #	R-IN32M3-CL Pin Name	Signal Name
1	P32	CCI_MON1_GMIIO
2	P33	CCI_WAITEDGEH
3	P34	CCI_WRLNH
4	RP17	CCI_MON0_GMIIBUFH

8.3. SW24: DIP Switch for CC-Link (Slave) Initialization Setting

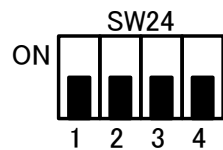
Location: H-3

Board Silk: SW24

Part #: COPAL CHS-04TB (or equivalent part)

SW24 is a 4-bit DIP switch connected to the I/O ports of the R-IN32M3-CL chip. This switch sets the initial values for the CC-Link (Slave).

*The 4th bit is left open.



Pin #	R-IN32M3-CL Pin Name	Signal Name
1	P22	CCS_IOTENSU
2	P23	CCS_SENYU0
3	P24	CCS_SENYU1
4	Open	-

8.4. SW17/SW20: Rotary Switches (2) for CC-Link Station Number Setting

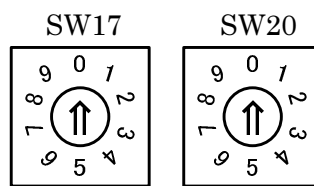
Location: F-3

Board Silk: SW17、SW20

Part #: COPAL SC-2110 (or equivalent part)

SW17 and SW20 are real code 10-position rotary switches connected to the I/O ports of the R-IN32M3-CL chip.

These switches set the station numbers for the CC-Link.



SW	Code	Position										R-IN32M3-CL Pin Name
		0	1	2	3	4	5	6	7	8	9	
SW17	1		●		●		●		●		●	P74
	2			●	●			●	●			P75
	4					●	●	●	●			P76
	8									●	●	P77

SW	Code	Position										R-IN32M3-CL Pin Name
		0	1	2	3	4	5	6	7	8	9	
SW20	1		●		●		●		●		●	P70
	2			●	●			●	●			P71
	4					●	●	●	●			P72
	8									●	●	P73

8.5. SW22: Rotary Switch for CC-Link (Master) Baud Rate Setting

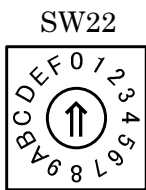
Location: F-4

Board Silk: SW22

Part #: COPAL SC-1110 (or equivalent part)

SW22 is a real code 16-position rotary switch connected to the I/O ports of the R-IN32M3-CL chip.

This switch sets the baud rate for the CC-Link (Master).



SW	Code	Position																R-IN32M3-CL Pin Name
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
SW22	1		●		●		●		●		●		●		●		●	P62
	2			●	●			●	●			●	●			●	●	P63
	4					●	●	●	●					●	●	●	●	P64
	8									●	●	●	●	●	●	●	●	P65

8.6. SW21: Rotary Switch for CC-Link (Slave) Baud Rate Setting

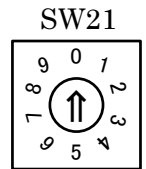
Location: F-4

Board Silk: SW21

Part #: COPAL SC-2110 (or equivalent part)

SW21 is a real code 10-position rotary switch connected to the I/O ports of the R-IN32M3-CL chip.

This switch sets the baud rate for the CC-Link (Slave).



SW	Code	Position										R-IN32M3-CL Pin Name
		0	1	2	3	4	5	6	7	8	9	
SW21	1		●		●		●		●		●	RP02
	2			●	●			●	●			RP03
	4					●	●	●	●			RP04
	8									●	●	RP05

8.7. SW18/SW19: Rotary Switches (2) for CC-Link IE Station Number Setting

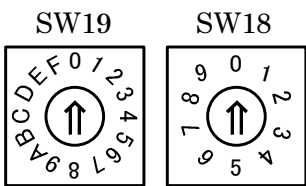
Location: B-3

Board Silk: SW18、SW19

Part #: COPAL SC-1110 / SC-2110 (or equivalent)

SW18 and SW19 are real code 16/10-position rotary switches connected to the I/O ports of the R-IN32M3-CL chip.

These switches set the station numbers for the CC-Link IE.



SW	Code	Position																R-IN32M3-CL Pin Name
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
SW19	1		●		●		●		●		●		●		●		●	RP12
	2			●	●			●	●			●	●			●	●	RP13
	4					●	●	●	●					●	●	●	●	RP14
	8									●	●	●	●	●	●	●	●	RP15

SW	Code	Position										R-IN32M3-CL Pin Name
		0	1	2	3	4	5	6	7	8	9	
SW18	1		●		●		●		●		●	RP06
	2			●	●			●	●			RP07
	4					●	●	●	●			RP10
	8									●	●	RP11

8.8. SW15/SW16: Push switches (2) for Reset

Location: B-5/B-6

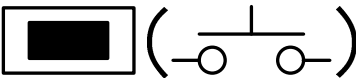
Board Silk: SW15, SW16

Part #: COPAL SKQMBBE010 (or equivalent)

SW15 and SW16 are tact switches (PUSH-SW) connected to the I/O ports of the R-IN32M3-CL chip.

These switches are used to input resets (RESETZ/HOTRESETZ).

*SW15 is for RESETZ, SW16 is for HOTRESETZ.



9. LED

9.1. Power Supply

Location: B-9

Board Silk: LED_PWR

Part #: STANLAY BR1111C (or equivalent part)

This is a red LED (1 bit) for monitoring the power supply.

9.2. LEDs for CC-Link IE Station Display

Location: C-3

Board Silk: See list below

Part #: STANLAY PG1111C (or equivalent part)

These are green LEDs (9 bits) for displaying the CC-Link IE station number.

*The LED turns on when the signal is LOW.

- KYOKU_1 (Green)
- KYOKU_2 (Green)
- KYOKU_4 (Green)
- KYOKU_8 (Green)
- KYOKU_10 (Green)
- KYOKU_20 (Green)
- KYOKU_40 (Green)
- KYOKU_80 (Green)
- KYOKU_100 (Green)

9.3. LEDs for Monitoring CC-Link IE Operations

Location: B-4

Board Silk: See list below

Part #: STANLAY BR1111C / PG1111C (or equivalent part)

These are green LEDs (9 bits) for monitoring CC-Link IE operations.

*The LED turns on when port is set to Low.

- IE_RUN (Green)
- IE_DLNK (Green)
- IE_ERR (Red)
- IE_LERR1 (Red)
- IE_LERR2 (Red)
- IE_SD (Green)
- IE_RD (Green)
- IE_REM (Green)
- IE_MODE (Green)

9.4. LEDs for CC-Link (Master/Slave) Monitoring Operations

Location: G-3

Board Silk: See list below

Part #: STANLAY BR1111C/PG1111C (or equivalent part)

These are red/green LEDs (8 bits) for monitoring CC-Link (Master/Slave) operations.

*The LED turns on port is set to Low.

- CC_LERR (Red) For Master or Slave use
- CC_ERR (Red) For Master use only
- CC_RUN (Green) For Master or Slave use
- CC_MST (Red) For Master use only
- CC_LRUN (Red) For Master or Slave use
- CC_RD (Red) For Master or Slave use
- CC_SD (Green) For Master or Slave use
- CC_SMST (Green) For Master use only

9.5. LED for External Host Switch Display

Location: H-4

Board Silk: HOST

Part #: STANLAY PG1111C (or equivalent part)

This green LED displays the external host switch.

This LED lights up when pin 3 (MEMIFSEL) of SW1 (DIP-SW) is ON.

9.6. LEDs for Monitoring UART (USB) Communications

Location: H-9

Board Silk: RX/TX

Part #: STANLAY PG1111C (or equivalent part)

These green LEDs (2 bits) are for monitoring the UART (USB) communication operations.

9.7. LEDs for Monitoring CC-Link IE Communications

Location: D-9/F-9/G-9

Board Silk: See list below

Part #: STANLAY BR1111C/AY1111C (or equivalent part)

These are red/yellow LEDs (4 bits per channel) for monitoring CC-Link IE communications.

- P_x_ERR (Red)
- P_x_LINK1000 (Yellow)
- P_x_LINK100 (Yellow)
- P_x_LINK10 (Yellow)

*x: indicates 0 or 1.

10. Connector Pin Definitions

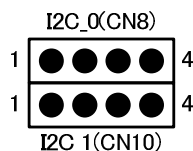
10.1. I2C Connector

Location: H-6

Board Silk: CN8/CN10

Connector: 4x1pins, 2.54mm pin header

Part #: E-TEC SL1-004-S116/01-55 (or equivalent part)



CN8

Pin #	I/O Dir.	R-IN32M3-CL Pin Name	Signal Name
1	–	–	GND
2	I/O	P60	SCL0
3	I/O	P61	SDA0
4	–	–	+3.3V

CN10

Pin #	I/O Dir.	R-IN32M3-CL Pin Name	Signal Name
1	–	–	GND
2	I/O	RP00	SCL0
3	I/O	RP01	SDA0
4	–	–	+3.3V

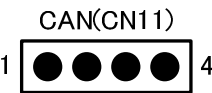
10.2. CAN Connector

Location: H-7

Board Silk: CN11

Type: 4 x1pin header, 2.54mm pitch

Part #: E-TEC SL1-004-S116/01-55 (or equivalent part)



CN11

Pin #	I/O Dir.	Signal Name
1	–	GND
2	I/O	CANH
3	I/O	CANL
4	–	+3.3V or +5.0V

10.3. UART (USB) Connector

Location: H-9

Board Silk: CN18

Type: USB mini-B

Part #: molex 54819-0519 (or equivalent part)



CN18

Pin #	I/O Dir.	Signal Name
1	–	(VBUS)
2	–	(ID)
3	I/O	D+
4	I/O	D–
5	–	GND

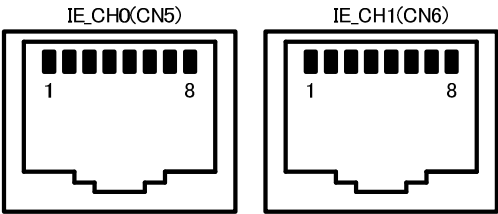
10.4. CC-Link IE (Giga-Ethernet) Connector

Location: E-10/G-10

Board Silk: CN5、CN6

Type: RJ-45 (built-in transistors), 2 units

Part #: JMCOMTECH JF-01J-0-H22-020-2 (or equivalent part)



CN5

Pin #	I/O Dir.	Signal Name	PHY Pin Name
1	I/O	MX1+	MDI[0]+
2	I/O	MX1-	MDI[0]-
3	I/O	MX2+	MDI[1]+
4	I/O	MX3+	MDI[2]+
5	I/O	MX3-	MDI[2]-
6	I/O	MX2-	MDI[1]-
7	I/O	MX4+	MDI[3]+
8	I/O	MX4-	MDI[3]-

CN6

Pin #	I/O Dir.	Signal Name	PHY Pin Name
1	I/O	MX1+	MDI[0]+
2	I/O	MX1-	MDI[0]-
3	I/O	MX2+	MDI[1]+
4	I/O	MX3+	MDI[2]+
5	I/O	MX3-	MDI[2]-
6	I/O	MX2-	MDI[1]-
7	I/O	MX4+	MDI[3]+
8	I/O	MX4-	MDI[3]-

10.5. JTAG (ICE) Connector

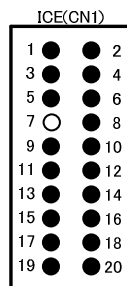
Location: H-5

Board Silk: CN1

Type: 10 x 2 pin header, 1.27mm pitch

Part #: E-TEC SS2-19A-H70/0-55/11 (or equivalent part)

*To prevent incorrect insertion, the 7th pin has been removed.



CN1

Pin #	I/O Dir.	Signal Name	R-IN32M3-CL Pin Name	Pin #	I/O Dir.	Signal Name	R-IN32M3-CL Pin Name
1	–	(Vtref)	–	11	–	TgrPwr	–
2	Output	TMS	TMS	12	Input	TRACECLK	TRACECLK
3	–	GND	–	13	–	TgrPwr	–
4	Output	TCK	TCK	14	Input	TRACEDATA0	TRACEDATA0
5	–	GND	–	15	–	GND	–
6	Output	TDO	TDO	16	Input	TRACEDATA1	TRACEDATA1
7	–	–	–	17	–	GND	–
8	Input	TDI	TDI	18	Input	TRACEDATA2	TRACEDATA2
9	–	GND	–	19	–	GND	–
10	Output	nRESET	TRSTZ	20	Input	TRACEDATA3	TRACEDATA3

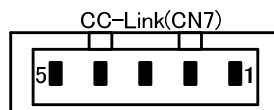
10.6. CC-Link Connector

Location: C-10

Board Silk: CN7

Type: 5-pin power clamp, board mount header

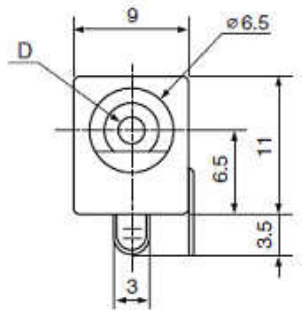
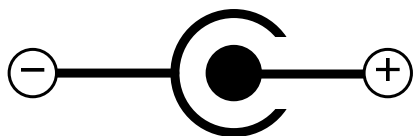
Part #: 3M 35605-5153-B00 PE



CN7

Pin #	I/O Dir.	Signal Name
1	I/O	DA
2	I/O	DB
3	–	DG
4	–	–
5	–	SLD

- 10.7. DC Power Jack
Location: B-9
Board Silk: CN12
Type: DC power jack
Part #: HOSIDEN HEC0470-01-630 (or equivalent part)



$D = \phi 2.0$

- 10.8. Power Connector
Location: B-8
Board Silk: CN19
Type: 2 x 1pin header, 2.54mm pitch
Part #: morex 22-11-2022 (or equivalent part)



CN19		
Pin #	I/O Dir.	Signal Name
1	-	+5.0V
2	-	GND

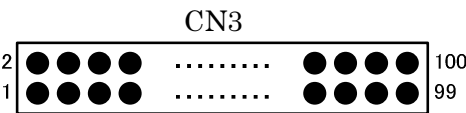
10.9. External memory/MCU Connector

Location: D-2

Board Silk: CN3

Type: 50 x 2 pin header, 0.6mm pitch

Part #: HRS FX8C-100P-SV1(92) (or equivalent part)



●When using connector as external memory interface

Pin #	I/O Dir.	Signal Name	Pin #	I/O Dir.	Signal Name
1	–	+3.3V	2	–	+3.3V
3	Output	P40(A1)	4	Output	A2
5	Output	A3	6	Output	A4
7	Output	A5	8	Output	A6
9	Output	A7	10	Output	A8
11	Output	A9	12	Output	A10
13	Output	A11	14	Output	A12
15	Output	A13	16	Output	A14
17	Output	A15	18	Output	A16
19	Output	A17	20	Output	A18
21	Output	A19	22	Output	A20
23	–	GND	24	–	GND
25	I/O	D0	26	I/O	D1
27	I/O	D2	28	I/O	D3
29	I/O	D4	30	I/O	D5
31	I/O	D6	32	I/O	D7
33	I/O	D8	34	I/O	D9
35	I/O	D10	36	I/O	D11
37	I/O	D12	38	I/O	D13
39	I/O	D14	40	I/O	D15
41	–	GND	42	–	GND
43	Output	WRSTBZ	44	Input	P43(HBUSCLK) *2
45	Input	P45(WAITZ1) *2	46	Output	RSTOUTZ *2
47	Input	P46(WAITZ2) *2	48	Input	NMIZ *2
49	Output	P42(HERROUTZ) *2	50	Output	WRZ0/BENZ0
51	Input	P47(WAITZ3) *2	52	Input	P41(WAITZ)
53	Output	RDZ	54	Output	WRZ1/BENZ1
55	Output	RP21(A21)	56	I/O	RP34(D28)
57	Output	RP23(A23)	58	I/O	RP36(D30)
59	–	GND	60	–	GND
61	Output	RP24(A24)	62	I/O	RP35(D29)
63	Output	RP22(A22)	64	I/O	RP37(D31)
65	Output	RP25(A25)	66	I/O	RP10(D16)
67	Output	RP27(A27)	68	I/O	RP11(D17)
69	Output	RP26(A26)	70	I/O	RP12(D18)
71	Output	RP20(BCYSTZ)	72	I/O	RP13(D19)
73	I/O	RP30(D24)	74	I/O	RP14(D20)
75	I/O	RP32(D26)	76	I/O	RP15(D21)
77	I/O	RP33(D27)	78	I/O	RP16(D22)
79	I/O	RP31(D25)	80	I/O	RP17(D23)
81	Output	P51(CSZ2)	82	I/O	RP01 *2
83	–	GND	84	–	GND
85	Output	P50(CSZ3)	86	I/O	RP00 *2
87	Output	RP07(WRZ3/BENZ3)	88	Output	CSZ0 *2
89	Output	RP06(WRZ2/BENZ2)	90	Output	P44(CSZ1) *2
91	I/O	RP05 *2	92	Output	CSZ1(244) *1
93	I/O	RP04 *2	94	I/O	RP02 *2
95	Output	CSZ0(244) *1	96	Output	HWRZSEL *2
97	I/O	RP03 *2	98	Output	BUSCLK
99	–	+3.3V	100	Input	EXT_RSTINZ

*1: The signal is output through 74S244.

*2: The signal is not used.

●When using connector as external MCU interface

Pin #	I/O Dir.	Signal Name	Pin #	I/O Dir.	Signal Name
1	–	+3.3V	2	–	+3.3V
3	Input	P40(HA1)	4	Input	A2
5	Input	A3	6	Input	A4
7	Input	A5	8	Input	A6
9	Input	A7	10	Input	A8
11	Input	A9	12	Input	A10
13	Input	A11	14	Input	A12
15	Input	A13	16	Input	A14
17	Input	A15	18	Input	A16
19	Input	A17	20	Input	A18
21	Input	A19	22	Input	A20
23	–	GND	24	–	GND
25	I/O	HD0	26	I/O	HD1
27	I/O	HD2	28	I/O	HD3
29	I/O	HD4	30	I/O	HD5
31	I/O	HD6	32	I/O	HD7
33	I/O	HD8	34	I/O	HD9
35	I/O	HD10	36	I/O	HD11
37	I/O	HD12	38	I/O	HD13
39	I/O	HD14	40	I/O	HD15
41	–	GND	42	–	GND
43	Input	WRSTBZ(HWRSTBZ)	44	Input	P43(HBUSCLK)
45	Output	P45(WAITZ1) *2	46	Output	RSTOUTZ *2
47	Output	P46(WAITZ2) *2	48	Input	NMIZ *2
49	Output	P42(HERROUTZ)	50	Input	WRZ0(HWRZ0/HBENZ0)
51	Output	P47(WAITZ3) *2	52	Output	P41(HWAITZ)
53	Input	RDZ(HRDZ)	54	Input	WRZ1(HWRZ1/HBENZ1)
55	Input	RP21(A21) *2	56	I/O	RP34(HD28)
57	Input	RP23(A23) *2	58	I/O	RP36(HD30)
59	–	GND	60	–	GND
61	Input	RP24(A24) *2	62	I/O	RP35(HD29)
63	Input	RP22(A22) *2	64	I/O	RP37(HD31)
65	Input	RP25(A25) *2	66	I/O	RP10(HD16)
67	Input	RP27(A27) *2	68	I/O	RP11(HD17)
69	Input	RP26(A26) *2	70	I/O	RP12(HD18)
71	Input	RP20(HBCYSTZ)	72	I/O	RP13(HD19)
73	I/O	RP30(HD24)	74	I/O	RP14(HD20)
75	I/O	RP32(HD26)	76	I/O	RP15(HD21)
77	I/O	RP33(HD27)	78	I/O	RP16(HD22)
79	I/O	RP31(HD25)	80	I/O	RP17(HD23)
81	Input	P51(CSZ2) *2	82	I/O	RP01 *2
83	–	GND	84	–	GND
85	Input	P50(CSZ3) *2	86	I/O	RP00 *2
87	Input	RP07(HWRZ3/HBENZ3)	88	Input	CSZ0(HCSZ)
89	Input	RP06(HWRZ2/HBENZ2)	90	Input	P44(HPGCSZ)
91	I/O	RP05 *2	92	Input	CSZ1(244) *1 *2
93	I/O	RP04 *2	94	I/O	RP02 *2
95	Input	CSZ0(244) *1 *2	96	Output	HWRZSEL *2
97	I/O	RP03 *2	98	Output	BUSCLK *2
99	–	+3.3V	100	Input	EXT_RSTINZ

*1: The signal is output through 74S244.

*2: The signal is not used.

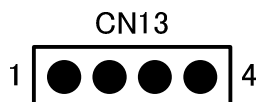
10.10. CC-Link IE Monitor Connector

Location: F-4

Board Silk: CN13

Type: 4 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-004-S116/01-55 (or equivalent part)



CN13

Pin #	I/O Dir.	R-IN32M3-CL Pin Name	Signal Name
1	I/O	P11	CCI_SYNC
2	I/O	P12	CCI_NMIZ
3	I/O	P66	CCI_INTZ
4	I/O	P67	CCI_CLKLOSSZ

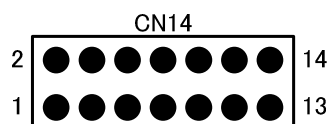
10.11. CC-Link Monitor Connector

Location: F-3

Board Silk: CN14

Type: 7 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL2-014-S116/01-55 (or equivalent part)



CN14

Pin #	I/O Dir.	R-IN32M3-CL Pin Name	Signal Name
1	I/O	P32	CCS_MON1
2	I/O	P33	CCS_MON2
3	I/O	P34	CCS_MON3
4	I/O	P11	CCS_MON4
5	I/O	P12	CCS_DCHANG
6	I/O	P02	CCS_STBMSK
7	I/O	P03	CCS_MON5
8	I/O	P04	CCS_MON6
9	I/O	P05	CCS_MON7
10	I/O	P06	CCS_MON0
11	I/O	P07	CCS_RESOUT
12	I/O	P10	CCS_REFSTB
13	I/O	P36	CCS_FUSEZ
14	I/O	-	-

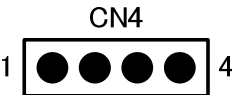
10.12. Test Monitor Connector

Location: C-4

Board Silk: CN4

Type: 4 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-004-S116/01-55 (or equivalent part)



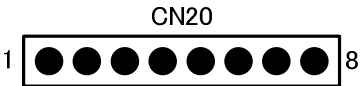
CN4			
Pin #	I/O Dir.	R-IN32M3-CL Pin Name	Signal Name
1	I/O	P27	TIN0/TOUT0
2	Output	RSTOUTZ	–
3	Input	NMIZ	–
4	Input	–	EXT_RSTINZ

Location: C-6

Board Silk: CN20

Type: 8 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-008-S116/01-55 (or equivalent part)



CN20		
Pin #	I/O Dir.	Signal Name
1	I/O	RP30
2	I/O	RP31
3	I/O	RP32
4	I/O	RP33
5	I/O	RP34
6	I/O	RP35
7	I/O	RP36
8	I/O	RP37

11. Table of Unused Pins and Pad Connection Pins

11.1. Unused Pins

The following table shows the pins on the board that are not used by the R-IN32M3-CL chips.

Pin Name	Unused Pin State
TMC1	Connect to GND
TMC2	Connect to GND
TMODE0	Connect to GND
TMODE1	Connect to GND
TMODE2	Connect to GND
XT1	Connect to GND
OSCTH	Connect to Power(+3.3V)
JTAGSEL	Connect to GND

11.2. PAD Connection Pins

The following pins are connected from R-IN32M3-CL and other chips to probing pads.

PADxx: 0.5mm pad (DIP)

TXCx: 0.8mm pad (DIP)

Pin Name	PAD Pin #	PAD Connection State
CCI_CLK2_097M	PAD1	–
CCM_CLK80M	PAD2	–
XT2	PAD3	–
XT1	PAD4	Connect to GND
TRSTZ	PAD5	–
P43(HBUSCLK)	PAD13	–
BUSCLK	PAD14	–
PONRZ	PAD15	Connect to Power(+3.3V)
RESETZ	PAD16	Connect to Power(+3.3V)
HOTRESETZ	PAD17	Connect to Power(+3.3V)
ETH0_GTXC	TXC0	–
ETH1_GTXC	TXC1	–

11.3. Test Pins

The following list shows the signals connected to each test pin on the evaluation board.

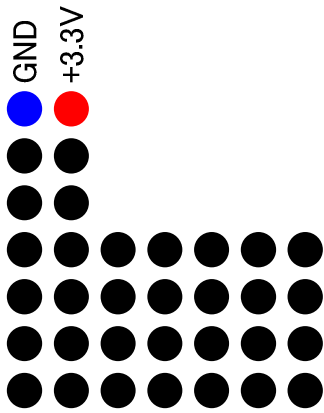
Test pin part #: MAC8 HK-5-G (Red/Black) (or equivalent part)

	Pin Name	Note
Power Supply	CL+5V	CC-Link Power
	+5.0V	Power Supply
	+3.3V	I/O Power
	+1.0V	Core Power
	+1.2V	PHY Power
	+2.5V	PHY Power
Ground	GND	Component Side
	GND	Component Side
	GND	Component Side
	GND	Component Side

11.4. Universal Pad

This evaluation board is mounted with a universal pad.

Universal pad: 2.54mm pitch (DIP)



12. Jumper Settings

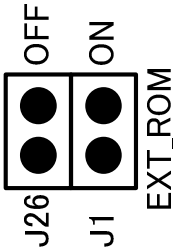
12.1. External Memory (Parallel_Flash) Pins

Location: D-4

Board Silk: J1、 J26

Connector: 2 x 1 pin header, 54mm pitch

Part #: E-TEC SL1-002-S116/01-55 (or equivalent part)



J1	J26	Ext. Memory (Parallel Flash)
Short	Open	Used
Open	Short	Not used

*Default factory setting: J1 is shortened, J26 is open

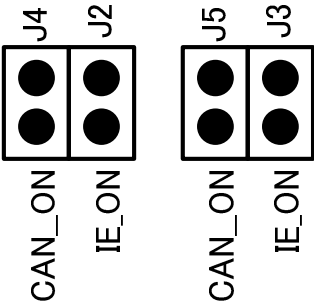
12.2. CC-Link IE PHY Reset Pins

Location: E-8/G-8

Board Silk: J2、 J3、 J4、 J5

Connector: 2 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-002-S116/01-55 (or equivalent part)

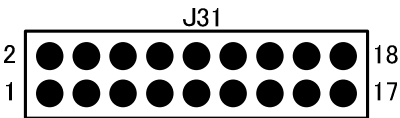


J2/J3	J4/J5	Connection
Short	Open	CC-Link IE
Open	Short	CAN_1

*Default factory setting: J2/J3 are shortened, J4/J5 are open

12.3. CC-Link IE LED Pins

Location: C-4
Board Silk: J31
Connector: 9 x 2 pin header, 2.54mm pitch
Part #: E-TEC SL2-018-S116/01-55 (or equivalent part)

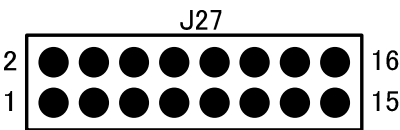


Pin #	CC-Link IE Concurrent use of CC-Link IE and CC-Link(Master)	CC-Link(Slave)
1-2	Short	Open
3-4		
5-6		
7-8		
9-10		
11-12		
13-14		
15-16		
17-18		

*Default factory setting: all shortened

12.4. CC-Link LED Pins

Location: G-3
Board Silk: J27
Connector: 8 x 2 pin header, 2.54mm pitch
Part #: E-TEC SL2-016-S116/01-55 (or equivalent part)



Pin #	CC-Link IE I2C_1 Concurrent use of CC-Link IE and I2C_1	CC-Link(Master) Concurrent use of CC-Link IE and CC- Link(Master)	CC-Link(Slave)
1-2	Open	Short	Short
3-4			Open
5-6			Short
7-8			Open
9-10			Short
11-12			Short
13-14			Short
15-16			Open

*Default factory setting: all open

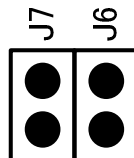
12.5. CC-Link Connector Terminal Pins

Location: D-9

Board Silk: J6、J7

Connector: 2 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-002-S116/01-55 (or equivalent part)



J6	J7	CC-Link terminal
Short	Short	Used
Open	Open	Not used

*Default factory setting: J6/J7 are open

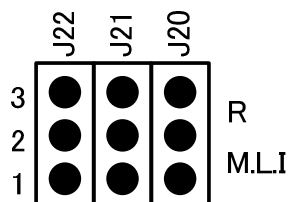
12.6. CC-Link Operating Mode Pins

Location: C-4/C-5

Board Silk: J20、J21、J22

Connector: 3 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-003-S116/01-55 (or equivalent part)



Silk Description

R: Remote device station

M.L.I.: Master station/ local station/intelligent device station

J20/J21/J22	CC-Link
1-2	Short Master station•Local station•Intelligent device station
2-3	Short Remote device station

*Default factory setting: 2-3 are shortened (remote device station)

12.7. CC-Link Power Supply Pin

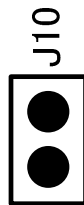
Location: C-7

Board Silk: J10

Connector: 2 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-002-S116/01-55 (or equivalent part)

By shortening this jumper, power can be supplied to the isolated DC/DC converter during CC-Link communications.



*Default factory setting: Open (no power supply)

*A jumper socket is included for CC-Link communications.

12.8. CC-Link Power Debug Pins

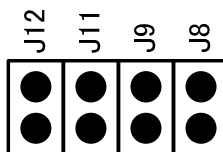
Location: C-7/C-8

Board Silk: J8, J9, J11, J12

Connector: 2 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-002-S116/01-55 (or equivalent part)

These jumper pins are used for isolated DC/DC power supply confirmation during factory testing, and are all shortened for the tests.



*Default factory setting: All open (normal mode)

*A jumper socket is included for debugging.

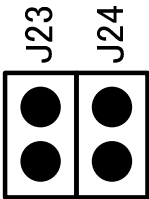
12.9. CC-Link Port Operation Pins

Location: G-6

Board Silk: J23、 J24

Connector: 2 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-002-S116/01-55 (or equivalent part)



J23	CCS_STBMSK
Short	Used
Open	Not used
J24	CCS_DCHANG
Short	Used
Open	Not used

*Default factory setting: all shortened (port use)

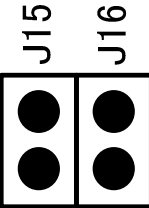
12.10. I2C-ch1 Pins

Location: G-6

Board Silk: J15、 J16

Connector: 2 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-002-S116/01-55 (or equivalent part)



J15	J16	Connection
Short	Short	I2C_channel1
Open	Open	CC-Link

*Default factory setting: all shortened (CC-Link use)

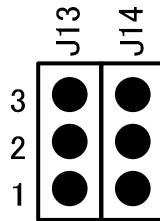
12.11. CAN Pins

Location: G-7

Board Silk: J13、 J14

Connector: 3 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-003-S116/01-55 (or equivalent part)



J13/J14		Connection
1-2	Short	Not used
2-3	Short	CAN_channel 1

*Default factory setting: 2-3 is shortened (CAN_ch1 use)

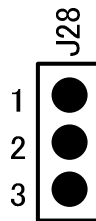
12.12. CAN Power Supply Pin

Location: G-8

Board Silk: J28

Connector: 3 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-003-S116/01-55 (or equivalent part)



J28		CAN Driver Power Supply
1-2	Short	+3.3V
2-3	Short	+5.0V

*Default factory setting: connected to +5.0V (2-3 shortened)

12.13. WDTZ(CC-Link) Pin

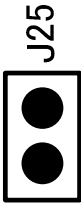
Location: F-5

Board Silk: J25

Connector: 2 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-002-S116/01-55 (or equivalent part)

This pin is shortened when Watch Dog Timer output (P13) is connected to the Watch Dog Timer input for CC-Link/CC-Link IE.



*Default factory setting: not connected (open)
*As this is optional, no jumper socket is included.

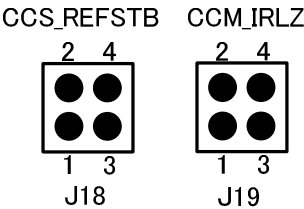
12.14. CC-Link Interrupt Selection Pins

Location: C-4

Board Silk: J18、 J19

Connector: 2 x 2 pin header, 2.54mm pitch

Part #: E-TEC SL2-004-S116/01-55 (or equivalent part)



J18		CCS REFSTB
1-2	Short	Connect to INTPZ0 (P00)
3-4	Short	Connect to INTPZ1 (P01)
J19		CCM IRLZ
1-2	Short	Connect to INTPZ0 (P00)
3-4	Short	Connect to INTPZ1 (P01)

*Default factory setting:
J18 1-2 shortened (INTPZ0 connection)
J19 3-4 shortened (INTPZ1 connection)

12.15. CC-Link IE Interrupt Connection Pin

Location: C-5

Board Silk: J17

Connector: 2 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-002-S116/01-55 (or equivalent part)

This pin is shortened when CCI_NMIZ output (P12) is connected to NMIZ input.



*Default factory setting: Open (no connection)

*As this is optional, no jumper socket is included.

12.16. External Reset Connection Pins

Location: B-6

Board Silk: J30

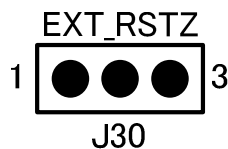
Connector: 3 x 1 pin header, 2.54mm pitch

Part #: E-TEC SL1-003-S116/01-55 (or equivalent part)

Pin 2 is connected to pin 100 (EXT_RSTINZ on the external MCU interface connector).

Pins 1-2 are shortened; EXT_RSTINZ signal is connected to RESETZ signal.

Pins 2-3 are shortened; EXT_RSTINZ signal is connected to HOTRESETZ signal.



*Default factory setting: Open (no connection)

*As this is optional, no jumper socket is included.

13. Default Factory Settings

The following section provides the default settings of the DIP-SW, Rotary-SW, and jumpers.

13.1. DIP-SW/Rotary-SW

SW	Value
SW1	ALL OFF
SW17	0
SW18	0
SW19	0
SW20	0
SW21	0
SW22	0
SW23	ALL OFF
SW24	ALL OFF

13.2. Jumpers

Jumper	Set	Jumper	Set
J1	shortened	J24	shortened
J2	shortened	J25	open
J3	shortened	J26	open
J4	open	J27	1-2 : open
J5	open		3-4 : open
J6	open		5-6 : open
J7	open		7-8 : open
J8	open		9-10 : open
J9	open		11-12 : open
J10	open		13-14 : open
J11	open		15-16 : open
J12	open	J28	2-3 : shortened
J13	2-3 : shortened	J30	open
J14	2-3 : shortened	J31	1-2 : shortened
J15	open		3-4 : shortened
J16	open		5-6 : shortened
J17	open		7-8 : shortened
J18	1-2 : shortened		9-10 : shortened
J19	3-4 : shortened		11-12 : shortened
J20	2-3 : shortened		13-14 : shortened
J21	2-3 : shortened		15-16 : shortened
J22	2-3 : shortened		17-18 : shortened
J23	shortened	-	-

13.3. MAC Address

The MAC address is provided on a seal attached to the board's soldering side, and is also stored in the memory area specified below.

Serial_Flash area: 6 bytes starting from 0x007F_F000

14.3. Dimensional Diagram

